EXPLANATION OF PLATES.

PLATE 13.

Fig. 1. Eggs.
Fig. 2. Larva.
Fig. 3. Pupa.
Fig. 4. Adult.
Fig. 5. Pygidium of male.
Fig. 6. Mandible of larva.
Fig. 7. Head of larva.
Fig. 8. Labrum and maxillæ of larva.

PLATE 14.

Fig. 1. Dandelion rosette showing young buds at the time when the egg punctures are made.
Fig. 2. Dandelion bud showing egg puncture through the involucre; also blackened spots formed by the milky fluid of the dandelion which oozes through the egg punctures and hardens on the outside.
Fig. 3. Eggs in situ.
Fig. 4. Interior of flower head showing the work of the larva.

PLATE 15.

Fig. 1. Deformed dandelion flower (side view).
Fig. 2. Deformed dandelion flower (looking into the head).
Fig. 3. Adult.
Fig. 4. Work of adults on a dandelion leaf.
Fig. 5. Cocoons.

NOTES CONCERNING GASTROPHILUS HÆMORROIDALIS LINNÆUS (DIPT.)[1]

BY R. R. PARKER,

BOZEMAN, MONT.

While studying the bionomics of the Rocky Mountain spotted fever tick in the Powder River Valley in eastern Montana, during the season of 1916, the writer was able to make several incidental observations on certain pests of cattle and horses. The most interesting of these concerned the nose fly, or redtailed bot, *Gastrophilus*

[1] Contribution from the Laboratory of the Montana State Board of Entomology, Bozeman, Montana.

hæmorrhoidalis Linnæus, and, to some extent, clear up the uncertainty concerning the reason why this fly is so obnoxious to horses.

On July 7, Mr. R. W. Wells, the writer's assistant, brought in a specimen of the nose fly captured just as it was about to "strike." At the end of the ovipositor was a minute black object, apparently an egg. Dissection of the abdomen proved this to be true and the peculiar shape of the egg at once suggested the cause of irritation to horses. Fig. 1 shows that it consists of two parts, an enlarged, laterally flattened portion and a slender, stalked portion. It seemed likely that if the latter should be thrust into the nose or lips of a horse, its penetration would undoubtedly cause a sharp pain sufficient to account for the nervous and sometimes uncontrollable fear shown by horses when the fly is "striking." The examination of several horses fully substantiated the supposition. Some eggs were found thrust in but a short distance, but most of them to the full length of the stalk. Due to their minute size they were somewhat difficult to discern, especially when the skin around the mouth was dark. They were found principally in the upper lip, but also in the lower lip and nostrils and doubtless may be inserted at other points near the mouth.

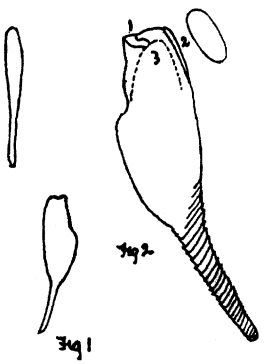

Fig. 1. Side and edge views of egg of *Gastrophilus hæmorrhoidalis.*

Fig. 2. Outline sketch of egg of *Gastrophilus hæmorrroidalis:* (1) Micropyle, (2) Cap in place and removed, (3) Developing embryo.

Eggs dissected from the abdomen averaged 1.35 millimeters in length, the stalked portion slightly more than .50 millimeter. Except near the extremity of the enlarged portion, the chorion seems to

consist of chitinous bands. On the stalked portion these "bands" are widest and appear like a spiral, the margin farthest from the tip having the greater circumference. This gives the stalk the general appearance of a screw and the structure is patently adapted to hold the egg in the skin after insertion. Fig. 2 is an outline sketch to show the micropyle and the cap, the latter probably permitting the escape of the larva. Horses, immediately upon being "struck," often rub their noses and lips violently on the ground, posts, or other handy object. This action may loosen the cap, but apparently is not effective in dislodging the eggs.

Both males and females were seen in the vicinity of horses, the latter greatly predominating. There is some reason to believe that copulation takes place on the wing in the vicinity of horses, but sufficient observations were not made to feel certain on this point.

As noted at Powderville, Montana, the nose fly first appears about the middle of June and stays until the middle of July. This same period was that of greatest abundance for *G. equi* Fabricius and *G. nasalis* Linnæus. The latter two species were afterwards seen occasionally until shortly after the first of September, when the field work was brought to a close. During the time when the nose fly is abundant horses are often irritated even by the buzzing of blow flies and others that make a similar noise.

The above observations are interesting in view of the fact that it has been previously supposed that the eggs were fastened to hairs about the mouth, or according to one writer, in the vicinity of the anus. The fact that larvæ may be found attached to the rectum may have been responsible for the latter idea. Several lots of larvæ detached from the rectum and reared to the adult, proved to be *Gastrophilus hæmorrhoidalis.*

The writer acknowledges his indebtedness to Mr. R. W. Wells, who assisted him in most of the observations made.